

REMARKS

With this Amendment, Claims 1, 31-34, 37, 41, 46, 48-52, 54-60, 65, 70, 77-81, 84-88, 90, 91, 97, 99-102, 106, 108, 112 and 117 are amended. Claims 1-4, 6-15, 17-21, 23-35 and 37-120 are presently pending in the application.

The Office Action objected to the drawings under 37 C.F.R. 1.83(a), stating that the drawings must show every feature of the invention specified in the claims. More particularly, the Office Action stated that “the ball roller; and the legs composed of a transparent material must be shown or the feature(s) canceled from the claim(s).” In response, Applicants direct the Examiner’s attention to, for example, Figure 24 and the related text of Applicants’ application. Page 26, lines 13-27, for example, describe at least one tissue contacting arm 212 extending from the handpiece 198, wherein part or all of the tissue contacting arm or arms and bridging structure may be formed of a transparent material such as a transparent plastic. The tissue contacting arm 212 is described as comprising a proximal end 214 and a distal end 216 having “one or more rounded surfaces (e.g., ball rollers).” It is noted that reference number 216 was missing from Figure 24. This reference number 216 has been added as shown in the Proposed Drawing Correction attached hereto as Appendix A. Accordingly, Applicants respectfully submit that Figure 24, as amended, illustrates a ball roller disposed at the distal end of an transparent tissue contacting arm. Applicants request that the Examiner reconsider and withdraw the objection to the drawings.

The Office Action rejected claim 39 under 35 U.S.C. 112, first paragraph, as allegedly containing subject matter which was not described in the specification in

such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. In particular, the Office Action stated that the originally filed disclosure is silent on lubricating a ball roller. In response, Applicants direct the Examiner's attention to, for example, page 27, lines 6-12, which state that one or more of the distal ends may comprise a ball roller and that water from the moisture output 210 can help the tissue contacting arm glide over the target surface wherein the water or other fluid may comprise an additive having lubricating properties. Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claim 39 under 35 U.S.C. 112, first paragraph.

The Office Action rejected claims 1-4, 6-15, 17-21, 23-35 and 37-120 under 35 U.S.C. 112, second paragraph, as being indefinite for allegedly failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. In particular, the Office Action stated that the terms "moisture output" and "fluid output" appear to be used interchangeably to refer to both the mechanism for outputting moisture or fluid and the moisture or fluid which is output by such mechanism, and referred to claim 94 as an example. In response, Applicants submit that the terms "moisture output" and "fluid output" refer to the structures of the apparatus for outputting moisture and fluid respectively, and do not refer to the moisture and fluid which can be output by the respective structures. Thus, for example, the language in claim 94 reciting that "the fluid output comprises water" means that the structure for outputting fluid comprises or contains water as distinguished from not comprising any water and being empty.

Regarding the "[o]ther claims dependent on method claims (e.g. claim 31) [which] include preambles such as "The apparatus ...," these claims have been amended to refer to methods rather than apparatuses. The Office Action further alleged that the "focusing or directing steps" (presumably of claims 56-59) do not

manipulatively define over those of claim 31. Applicants respectfully disagree, but in an effort to expedite the prosecution of the subject application have amended the subject claims to recite further steps of providing predetermined solid state lasers having predetermined wavelengths which steps even more clearly manipulatively define over those of claim 31.

Regarding the Office Action's statement that claim 54 is indefinite as purporting to depend from claim 31a which does not exist, Applicants have amended claim 54 to depend from claim 31. Similarly, the phrase "the source of electromagnetic radiation" in claim 41 has been amended to read "the source of electromagnetic energy" to thereby provide proper antecedent basis for the phrase.

The Office Action stated that "[c]laims 91, 100, and 112 all recite the surface contacted by the contacting leg, which is the skin as such these claims and their dependants are indefinite for claiming the body and further indefinite because it is unclear what further structure is recited thereby." In response, Applicants respectfully submit that neither claim 90, 91, 99, 100, 108 nor 112 recite skin or even tissue for that matter. Moreover, page 25, lines 4-12 of Applicants' specification state that the target surface may be, for example, crystal or glass. Accordingly, Applicants submit that claims 91, 100 and 112 are not indefinite for claiming the body. Moreover, claims 91, 100 and 112 all recite additional structure over the corresponding independent claims 90, 99 and 108, respectively, from which they depend. For example, amended claim 91 now recites that the source of electromagnetic energy and the at least one contacting leg are positioned and coupled to the housing relative to one another in such a way that, when the at least one contacting leg contacts a surface the surface contacted by the at least one contacting leg is in close proximity to the interaction zone which is aligned to receive focused or concentrated electromagnetic energy from the source of

electromagnetic energy, and recites a further limitation that the fluid output comprises a moisture output.

Claim 101 was categorized as being indefinite for not introducing further structure beyond a mere intended use of the device. While disagreeing with this characterization, Applicants have amended this claim in an effort to expedite the prosecution of the present application so that the claim now further recites that the source of electromagnetic energy comprises a laser, which is configured and capable of imparting thermal cutting forces and coagulation onto or within a tissue target surface.

In claim 102, the relevant language has been amended to recite a plurality of contacting legs with each contacting leg "comprising a rounded foot." With regard to claims 110 and 111, they were determined by the Office Action to be incomplete for reciting the fluid output, but not reciting any fluid per se or reservoir therefor. In response, Applicants submit that the term "fluid output" refers to the structure of the apparatus for outputting fluid, and does not refer to the fluid which can be output by the fluid output. Thus, for example, the language in claim 110 reciting that "the fluid output comprises water" means that the structure for outputting fluid comprises or contains water as distinguished from not comprising any water and being empty. Applicants respectfully submit that a recitation of a reservoir is not required in independent claim 108 for dependent claims 110 and 111 to be clear and definite.

Regarding the Examiner's apparent concern that the terms "absorption," "highly absorbed" and "not highly absorbed" are unclear, Applicants again submit that "absorption" should have its common meaning which is consistent with the wording of the instant application. The term "highly absorbed" is to be interpreted in view of the wording of the instant application. For instance, the present

application states on page 6, lines 14-23 that “[I]n the presently preferred embodiment, the laser comprises either an erbium, chromium, yttrium, scandium, gallium garnet (Er, Cr:YSGG) solid state laser, which generates electromagnetic energy having a wavelength in a range of 2.70 to 2.80 microns, or an erbium, yttrium, aluminum garnet (Er:YAG) solid state laser, which generates electromagnetic energy having a wavelength of 2.94 microns . . . [and] the fluid emitted from the nozzle 71 preferably comprises water.” When the above-disclosed electromagnetic energy sources and fluids are used in the context of the present invention, high absorption occurs. On page 7, lines 14-17, it is stated that “water is chosen as the preferred fluid” and that “the actual fluid used may vary as long as it is properly matched (meaning it is highly absorbed) to the selected electromagnetic energy source (i.e. laser) wavelength.” Thus, “high absorption” and “low absorption” are determined not only by the laser wavelength but also by the fluid type, and it is noted that the parent application teaches that fluids with absorption characteristics other than pure water may be used.

According to the Office Action “the fact that all the disclosed wavelengths are specifically discussed as highly absorbed in the parent, still renders the term indefinite, as it is unclear how they suddenly become “not highly absorbed” herein. It would appear that the Examiner understands all wavelengths disclosed in the parent application to be categorized as “highly absorbed,” which cannot be correct, and further understands those same wavelengths to be disclosed in the present application as not highly absorbed, which cannot be correct. Thus, Applicants do not understand the Examiner’s line of reasoning and do not feel capable of further responding. To the extent that the Examiner’s concern remains, this matter may best be resolved by way of a telephone interview.

In view of the above, Applicants request that the rejection under 35 U.S.C. 112, second paragraph, be reconsidered and withdrawn.

Claims 1, 32, 38, 53-59 and 82-88 were rejected under 35 U.S.C. 102(b) as being anticipated by Rizo et al. (WO '928). Regarding the Office Action's reference to claims 1-4, the paragraph bridging pages 52 and 53, and the paragraph bridging pages 10 and 11 of WO '928, Applicants respectfully submit that WO '928 nowhere discloses among other things "at least one contacting leg" as recited in claim 1. Nor does WO '928 disclose a method including among other things "focusing ... energy ... over substantially an entire treatment area of the target surface ...; placing first amounts of moisture ...; focusing ... energy ... over substantially the same treatment area of the target surface ...; and placing second amounts of moisture into the interaction zone ... [that are] less than the first amounts of moisture," as recited in claim 31 (from which claims 32 and 53-59 depend). Each of claims 32 and 53-59 recite additional limitations that when combined with the limitations of claim 31 are not disclosed in WO '928. For example, claim 32 adds that the "first amounts ... [comprise] an anesthetic and a vasal constrictor ... and ... the second amounts of moisture contain no or lower concentrations of anesthetic and vasal constrictor than the first amounts." An exemplary implementation of this claim 32 would be to make a first pass over a target with laser energy, anesthetic and vasal constrictor, and then to make a second pass over the same target with only laser energy and water. Such a combination of steps as set forth in claim 32 is not disclosed in WO '928. As another example, claim 53 adds that "the first amounts ... comprise a first composition [that is] ... different than the second composition," and as yet another example claim 54 adds that "the first amounts ... comprise an anesthetic." Regarding claim 38, WO '928 nowhere discloses "scanning electromagnetic energy" and certainly does not disclose two consecutive steps of scanning over the same target with different amounts of water being used for each scan. Each of claims 82-88 recite additional limitations that when combined with the limitations of claim 38 are not disclosed in

WO '928. Thus, Applicants submit that WO '928 does not disclose any of the claimed combinations of presently pending claims 1, 32, 38, 53-59 and 82-88.

Claims 33, 62, 99, 100, 108, 112 and 119 were rejected under 35 U.S.C. 102(b) as being anticipated by Itzkan (U.S. Patent No. 4,733,660). Applicants disagree with, for example, the statement that the device of Itzkan would heat water to expansion thereby imparting disruptive forces onto a target surface. Moreover, Itzkan nowhere discloses Applicants' claimed combinations including, among other things, at least one contacting leg constructed to contact the target surface and to "space the interaction zone between the source of electromagnetic energy and the target surface when the electromagnetic energy is being focused ... into the interaction zone," as recited in independent claims 33 (from which claims 62 and 119 depend), 99 (from which claim 100 depends) and 108 (from which claim 112 depends). Each of claims 62, 100, 112 and 118 recite additional limitations that when combined with the limitations of independent claim 33, 99 and 108 are not disclosed by Itzkan. Applicants submit that Itzkan does not disclose any of the claimed combinations of presently pending claims 33, 62, 99, 100, 108, 112 and 119.

The Office Action rejected claims 29-32, 37, 38, 48-59 and 77-89 under 35 U.S.C. 103(a) as being unpatentable over WO '928 in view of Vassiliadis et al. (U.S. Patent No. 5,324,200). The Office Action pointed to various passages to show that the electromagnetically induced mechanical cutter of WO '928 can be used in conjunction with the Vassiliadis et al. laser. Even to the extent they can both be used to cut teeth, there is still no motivation to combine these two devices in a single dental procedure. According to the Examiner, Vassiliadis et al. teaches first and second passes of his laser over a target surface, without simultaneous use of water, for desensitizing and then rapidly cutting the tooth, respectively. The Office Action then stated that it would have been obvious to combine these steps of

Vassiliadis et al. with WO '928 to "provide rapid tissue removal ... while enabling the thermally damaged tissue remaining to be removed by the non-thermal cutting of ... WO '928."

It would appear that Vassiliadis et al. teaches a low-power desensitizing pass of a laser, without water, followed by a high-power rapid cutting pass of the laser, without water, to reduce pain and thereby achieve rapid cutting of the tooth. However, there is no teaching or suggestion in WO '928 that there would be any tooth pain to reduce or that cutting speed or efficiency would be compromised with the WO '928 device. In fact, it is quite possible that the WO '928 device would already, without modification, operate in a rapid, pain-free fashion on the tooth. For example, page 23, lines 26-34 of WO '928 state that the "prior art optic cutter must use a large amount of laser energy to cut the area of interest, and also must use a large amount of water to both cool this area of interest and remove cut tissue. In contrast, the electromagnetically induced mechanical cutter of the present invention uses a relatively small amount of water and, further, uses only a small amount of laser energy to expand atomized fluid particles generated from the water." This passage would appear to teach away from any non-water mode of the WO '928 device. In any event, the passage suggests that the cutting mechanisms are indeed quite different.

Moreover, regarding pain, one skilled in the art at the time of the invention would be aware of the product covered by the WO '928 patent which is known as the WaterLase® cutter and which was known at the time of the invention to operate without inducing substantial pain on teeth. (See www.biolase.com.) Thus, one skilled in the art at the time of the invention and having possession of WO '928 would look to Vassiliadis et al. neither for pain-free methods nor for rapid cutting methods. Nor would one skilled in the art at the time of the invention and having possession of Vassiliadis et al. look to combine the teachings thereof with those of

WO '928 since in Applicants' opinion such a skilled person would simply adopt the WO '928 cutter altogether rather than try to combine it with the cutter of Vassiliadis et al. Using another line of reasoning, one skilled in the art at the time of the invention and having possession of Vassiliadis et al. would not look to combine the teachings thereof with those of WO '928 since that skilled person would, according to the admissions of the Vassiliadis et al. disclosure, already have with Vassiliadis et al. an allegedly reduced-pain and fast-cutting system. If Vassiliadis et al. were seeking a good bonding surface, his laser may or may not already provide such, and to the extent he were to seek guidance from WO '928 for providing a good bonding surface Applicants maintain that such a skilled person still would have no motivation to combine the two technologies to yield the claimed invention. A more likely scenario would be that the skilled artesian would, upon determining that one system provided a better bonding surface for the application at hand, simply adopt the laser providing such a better bonding surface.

The Office Action rejected claims 33-35, 60-76, 99-109 and 111-120 under 35 U.S.C. 103(a) as being unpatentable over WO '928 in combination with Rizou et al (1994 "The Efficiency ...") and Sharon et al. (U.S. Patent No. 3,865,113). Applicants respectfully disagree with this rejection. None of the prior art references, taken separately or together, disclose an apparatus for imparting disruptive forces onto a target surface, comprising, among other things, "a housing; a source of electromagnetic energy ... constructed to focus ... electromagnetic energy into an interaction zone ...; at least one contacting leg ... constructed to contact [a target] surface and to space the interaction zone between the source of electromagnetic energy and the target surface when the electromagnetic energy is being focused or directed into the interaction zone; a moisture output constructed to simultaneously place moisture into close proximity of the interaction zone simultaneously ... ; and a source of suction ... comprising at least one orifice and being constructed to receive [moisture from the moisture output] through the orifice

and into the at least one contacting leg,” as recited in independent, amended claims 33 and 34. Moreover, independent, amended claims 99 and 108 are directed to apparatuses for imparting disruptive forces onto a target surface, comprising, among other things, “a housing; a source of electromagnetic energy ... constructed to focus ... electromagnetic energy into an interaction zone ...; at least one contacting leg ... comprising a proximal end, a distal end ... and a width measured in a direction substantially transverse to the length, the distal end of the at least one containing leg comprising a ... foot ... to thereby facilitate contacting and [movement] of the at least one contacting leg on and over a surface, the ... foot being constructed to space the interaction zone between the source of electromagnetic energy and the target surface ...; a fluid output ...; and a source of suction coupled to the at least one contacting leg, the source of suction comprising an orifice and being constructed to receive through the orifice and into the at least one contacting leg fluid from the fluid output,” which is neither disclosed nor suggested by the prior-art references of record, taken separately or together.

Applicants submit that dependent claims 35, 60-76, 100-107, 109 and 111-120 are allowable at least because of their dependencies upon independent claims 33, 34, 99 and 108.

The Office Action rejected claims 1-4, 8, 10-15, 17-21, 23-28, 39-47, 90-98 and 110 under 35 U.S.C. 103(a) as being unpatentable over WO ‘928 in combination with Rizou et al (1994 “The Effect ...”) and Sharon et al. as applied to claims 33-35, 60-76, 99-109 and 111-120 above, and further in view of Fuller et al. Applicants respectfully disagree with this rejection. None of the prior art references, taken separately or together, disclose an apparatus for imparting disruptive forces onto a target surface, comprising, among other things, “a housing; a source of electromagnetic energy ... constructed to direct electromagnetic energy along a path from the source of electromagnetic energy to an interaction zone ... the source of electromagnetic energy being constructed to focus or direct a peak

concentration of electromagnetic energy into the interaction zone; at least one contacting leg ... comprising a ball ... constructed to contact a surface ... and to space the interaction zone between the source of electromagnetic energy and the target surface when the electromagnetic energy is being focused or directed along the path and into the interaction zone, the at least one contacting leg being coupled to the housing in such a way that the ball ... does not intersect the path; and a fluid output constructed to place fluid into the interaction zone, simultaneously ... at least part of the electromagnetic energy from the source of electromagnetic energy being absorbed by at least a portion of the fluid in the interaction zone, and the absorption of the electromagnetic energy by the fluid causing the fluid to expand and impart disruptive forces onto or within the target surface," as recited in independent, amended claims 1 and 90. Applicants note that Fuller et al. teaches away from spacing the interaction zone between the source of electromagnetic energy and the target surface, since the focal point 44 of Fuller et al. is disposed beneath the target surface. (See, for example, column 5, lines 22-25 and 55-56, and column 6, lines 13-16 of Fuller et al.) Fuller et al. further teaches that the cooling fluid be imparted only onto the roller ball. (See, for example, column 4, lines 35-38 and 47-48 of Fuller et al.) Moreover, Fuller et al. teaches away from Applicants' claimed combinations of roller balls or balls that do not intersect the paths of incident electromagnetic radiation. For at least the above reasons, Applicants submit that the above references would not be combined by one skilled in the art at the time of the invention to yield Applicants' claimed combinations. It is further submitted that dependent claims 2-4, 8, 10-15, 17-21, 23-28, 39-47, 91-98 and 110 are allowable at least because of their dependencies upon independent claims 1 and 90.

In view of the above, Applicants request that the rejections under 35 U.S.C. 102 and 103 be reconsidered and withdrawn.

Applicants respectfully submit that the application is now in condition for allowance, and an early indication of same is requested. The Examiner is invited to contact the undersigned with any questions.

Respectfully submitted,

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